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Reply to Office Action of 11/05/03

Amendments to the Claims:

This listing will replace all prior versions, and listing, of claims in the application.

1. (currently amended) A method of modifying ~~[[the]]~~ a slope of sidewalls of openings created in a layer of photoresist, comprising ~~the steps of:~~

providing a substrate, said substrate having been provided with semiconductor devices ~~in or on the surface thereof~~, at least one layer of semiconductor material having been deposited over ~~the surface of~~ said substrate, said at least one layer of semiconductor material being patterned ~~and etched~~ for creation of additional functional capabilities of said semiconductor devices ~~provided on the surface of said substrate;~~

coating a layer of photoresist over ~~the surface of~~ said at least one layer of semiconductor material ~~having been deposited over the surface of said substrate;~~

patterning ~~and developing~~ said layer of photoresist, creating at least one opening through said layer of photoresist having sidewalls, said at least one opening comprising a via hole ~~[[or]]~~ and an interconnect line trench;

providing a hot plate having a first and a second surface;

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mounting said substrate on the second surface of said hot plate, said second surface facing in about an upward direction;

placing said hot plate in about an upwards-down position, thereby facing said second surface of said hot plate in about a downwards direction, said second surface of said hot plate being ~~substantially~~ about parallel with a horizontal ~~direction plane,~~ said horizontal plane coinciding with a plane of the earth's surface;

applying energy in the form of heat to said hot plate, thereby supplying energy in the form of heat to said substrate and to said patterned ~~and developed~~ layer of photoresist created over ~~the surface of~~ said substrate;

~~continuing~~, ~~said application of energy in the form of heat to said hot plate for a~~ being applied for a first period of time having ~~a measurable duration;~~

discontinuing said application of energy in the form of heat, thereby discontinuing supplying energy in the form of heat to said substrate and to said patterned ~~and developed~~ layer of photoresist ~~created over the surface of said substrate;~~

~~continuing~~, ~~said discontinuing a said application in the form of heat to said hot plate for~~ being applied for a second period of time having ~~a measurable duration;~~

placing said hot plate in about an upwards position, thereby facing said second surface of said hot plate in about an

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[[a]] upwards direction, said second surface of said hot plate

being ~~substantially~~ about parallel with a horizontal ~~direction~~
plane, said horizontal plane coinciding with the plane of the
earth's surface, creating a modified layer of photoresist having
openings of modified slopes of [[the]] sidewalls of said
openings; and

continue conventional processing, using said modified layer
of photoresist for said patterning ~~and etching~~ of said at least
one layer of semiconductor material ~~for creation of additional~~
~~functional capabilities of said semiconductor devices provided~~
~~on the surface of said substrate.~~

2. (currently amended) The method of claim 1, said applying
energy in the form of heat to said hot plate resulting in
raising a temperature of said patterned ~~and developed~~ layer of
photoresist to at least a glass transition temperature TG.

3. (currently amended) A method of changing Critical Dimension
in a layer of photoresist that is used for [[the]] creation of
device features that collectively comprise a semiconductor
device, comprising ~~the steps of:~~

providing a substrate, said substrate having been provided
with semiconductor devices ~~in or on the surface thereof,~~ at
least one layer of semiconductor material having been deposited

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over ~~the surface of~~ said substrate, said at least one layer of semiconductor material being patterned ~~and etched~~ for creation of device features of semiconductor devices created on ~~the surface of~~ said substrate;

creating a patterned ~~and developed~~ layer of photoresist having a surface over ~~the surface of~~ said at least one layer of semiconductor material, creating at least one opening through said layer of photoresist having sidewalls having an angle of intersect with said at least one layer of semiconductor material, said at least one opening comprising a via hole ~~[[or]]~~ and an interconnect line trench; and

changing said angle of intersect of said sidewalls of said at least one opening created in said patterned ~~and etched~~ layer of photoresist by raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist while placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal direction plane, said horizontal plane coinciding with the plane of the earth's surface.

4. (currently amended) The method of claim 3, whereby said raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist comprises ~~the steps of~~:

providing a hot plate having a first and a second surface;

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mounting said substrate on the second surface of said hot plate;

applying energy in the form of heat to said hot plate, thereby supplying energy in the form of heat to said substrate and to said patterned ~~and developed~~ layer of photoresist ~~created over the surface of said substrate~~; and

continuing said application of energy in the form of heat to said hot plate for a first period of time ~~having a measurable duration~~.

5. (currently amended) The method of claim 4, ~~with additional steps of:~~ additionally

discontinuing said application of energy in the form of heat, thereby discontinuing supplying energy in the form of heat to said substrate and to said patterned ~~and developed~~ layer of photoresist ~~created over the surface of said substrate~~, ,

~~continuing~~ said discontinuing being applied ~~a said application in the form of heat to said hot plate~~ for a second period of time ~~having a measurable duration~~.

6. (currently amended) The method of claim 5 with additional steps of continuing conventional processing, using said changed Critical Dimension in a layer of photoresist ~~that is used for the creation of device features~~ for creation of additional

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functional capabilities of said semiconductor devices provided
on ~~the surface of~~ said substrate.

7. (currently amended) The method of claim 3, wherein said placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal direction comprises ~~the steps of:~~

providing a hot plate having a first and a second surface;
mounting said substrate on the second surface of said hot plate, said second surface facing in ~~[[an]]~~ a first direction;
and

placing said hot plate facing in a second direction.

8. (currently amended) The method of claim 7, said first direction being ~~substantially~~ about an upward direction.

9. (original) The method of claim 7, said second direction being any direction not comprising an upward direction.

10. (currently amended) A method of reducing ~~[[the]]~~ pitch of via openings that are created through a layer of dielectric, comprising ~~the steps of:~~

providing a substrate, said substrate having been provided with semiconductor devices ~~in or on the surface thereof~~, at

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least one layer of dielectric having been deposited over ~~the~~

~~surface of~~ said substrate, said at least one layer of dielectric

being patterned ~~and etched~~ for creation of via openings

~~therethrough~~ there-through;

creating a patterned ~~and developed~~ layer of photoresist

having a surface over ~~the surface of~~ said at least one layer of

dielectric, creating at least one opening through said layer of

photoresist having sidewalls having an angle of intersect with

said at least one layer of dielectric, said at least one opening

comprising a via opening; and

changing said angle of intersect of said sidewalls of said

at least one opening created in said patterned ~~and etched~~ layer

of photoresist by raising a temperature of said layer of said

patterned ~~and etched~~ layer of photoresist while placing said

surface of said patterned ~~and etched~~ layer of photoresist under

an angle with a horizontal ~~direction~~ plane, said horizontal

plane coinciding with the plane of the earth's surface.

11. (currently amended) The method of claim 10, whereby said

raising a temperature of said layer of said patterned ~~and etched~~

layer of photoresist comprises ~~the steps of~~:

providing a hot plate having a first and a second surface;

mounting said substrate on the second surface of said hot
plate;

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applying energy in the form of heat to said hot plate,
thereby supplying energy in the form of heat to said substrate
and to said patterned ~~and etched~~ layer of photoresist ~~created~~
~~over the surface of said substrate;~~ and

continuing said application of energy in the form of heat
to said hot plate for a first period of time ~~having a measurable~~
~~duration.~~

12. (currently amended) The method of claim 11, ~~with additional~~
~~steps of:~~

additionally discontinuing said application of energy in
the form of heat, thereby discontinuing supplying energy in the
form of heat to said substrate and to said patterned ~~and~~
~~developed~~ layer of photoresist ~~created over the surface of said~~
~~substrate;~~

~~continuing,~~ said discontinuing ~~a said application in the~~
~~form of heat to said hot plate~~ being applied for a second period
of time ~~having a measurable duration.~~

13. (currently amended) The method of claim 12 with additional
steps of continuing conventional processing, using said changed
Critical Dimension in a layer of photoresist ~~that is used for~~
~~the creation of device features~~ for creation of additional

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functional capabilities of said semiconductor devices provided
on ~~the surface of~~ said substrate.

14. (currently amended) The method of claim 10, wherein said placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal ~~direction~~ plane comprises ~~the steps of~~:

providing a hot plate having a first and a second surface;
mounting said substrate on the second surface of said hot plate, said second surface facing in an first direction; and
placing said hot plate facing in a second direction.

15. (currently amended) The method of claim 14, said first direction being ~~substantially~~ about an upward direction.

16. (original) The method of claim 14, said second direction being any direction not comprising an upward direction.

17. (currently amended) A method of reducing ~~[[the]]~~ distance between adjacent interconnect line trenches ~~that are~~ created through a layer of dielectric, comprising ~~the steps of~~:

providing a substrate, said substrate having been provided with semiconductor devices ~~in or on the surface thereof~~, at least one layer of dielectric having been deposited over ~~the~~

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~~surface~~ of said substrate, said at least one layer of dielectric being patterned ~~and etched~~ for creation of interconnect line trenches ~~therethrough~~ there-through;

creating a patterned ~~and developed~~ layer of photoresist having a surface over ~~the surface of~~ said at least one layer of dielectric, creating at least one interconnect line trench through said layer of photoresist having sidewalls having an angle of intersect with said at least one layer of dielectric; and

changing said angle of intersect of said sidewalls of said at least one interconnect trench ~~created in said patterned and etched layer of photoresist~~ by raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist while placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal direction plane, said horizontal plane coinciding with the plane of the earth's surface.

18. (currently amended) The method of claim 17, whereby said raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist comprises ~~the steps of~~:

providing a hot plate having a first and a second surface;
mounting said substrate on the second surface of said hot plate;

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applying energy in the form of heat to said hot plate,
thereby supplying energy in the form of heat to said substrate
and to said patterned ~~and developed~~ layer of photoresist ~~created~~
~~over the surface of said substrate~~; and

continuing said application of energy in the form of heat
to said hot plate for a first period of time ~~having a measurable~~
~~duration~~.

19. (currently amended) The method of claim 18, ~~with additional~~
~~steps of:~~

additionally discontinuing said application of energy in
the form of heat, thereby discontinuing supplying energy in the
form of heat to said substrate and to said patterned ~~and~~
~~developed~~ layer of photoresist created over the surface of said
substrate;

~~continuing,~~ said discontinuing ~~a said application in the~~
~~form of heat to said hot plate~~ being applied for a second period
of time ~~having a measurable duration~~.

20. (currently amended) The method of claim 19 with additional
steps of continuing conventional processing, using said reduced
distance between adjacent interconnect line trenches in a layer
of photoresist ~~that is used for the creation of device features~~

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for creation of additional functional capabilities of said

semiconductor devices provided on ~~the surface of~~ said substrate.

21. (currently amended) The method of claim 17, wherein said placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal direction comprises ~~the steps of:~~

providing a hot plate having a first and a second surface;

mounting said substrate on the second surface of said hot plate, said second surface facing in an first direction; and

placing said hot plate facing in a second direction.

22. (currently amended) The method of claim 21, said first direction being ~~substantially~~ about an upward direction.

23. (original) The method of claim 21, said second direction being any direction not comprising an upward direction.

24. (currently amended) A method of reducing ~~[[the]]~~ pitch of via openings and ~~[[the]]~~ distance between adjacent interconnect line trenches that are created through a layer of dielectric, comprising ~~the steps of:~~

providing a substrate, said substrate having been provided with semiconductor devices ~~in or on the surface thereof~~, at

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least one layer of dielectric having been deposited over ~~the~~

~~surface of~~ said substrate, said at least one layer of dielectric being patterned ~~and etched~~ for creation of via openings and interconnect line trenches ~~therethrough~~ there-through;

creating a patterned ~~and developed~~ layer of photoresist having a surface over ~~the surface of~~ said at least one layer of dielectric, creating at least one via opening and at least one interconnect line trench through said layer of photoresist having sidewalls having an angle of intersect with said at least one layer of dielectric; and

changing said angle of intersect of said sidewalls of said at least one via opening and said at least one interconnect trench ~~created in said patterned and etched layer of photoresist~~ by raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist while placing said surface of said patterned ~~and etched~~ layer of photoresist under an angle with a horizontal ~~direction~~ plane, said horizontal plane coinciding with the plane of the earth's surface.

25. (currently amended) The method of claim 24, whereby said raising a temperature of said layer of said patterned ~~and etched~~ layer of photoresist comprises ~~the steps of~~:

providing a hot plate having a first and a second surface;

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mounting said substrate on the second surface of said hot plate;

applying energy in the form of heat to said hot plate, thereby supplying energy in the form of heat to said substrate and to said patterned ~~and etched~~ layer of photoresist ~~created over the surface of said substrate~~; and

continuing said application of energy in the form of heat to said hot plate for a first period of time ~~having a measurable duration~~.

26. (currently amended) The method of claim 25, ~~with additional steps of:~~ additionally discontinuing said application of energy in the form of heat, thereby discontinuing supplying energy in the form of heat to said substrate and to said patterned ~~and developed~~ layer of photoresist ~~created over the surface of said substrate~~;

~~continuing,~~ said discontinuing ~~a said application in the form of heat to said hot plate~~ being applied for a second period of time ~~having a measurable duration~~.

27. (currently amended) The method of claim 26 with additional steps of continuing conventional processing[[,]] using said reduced pitch between via openings and said reduced distance between adjacent interconnect line trenches in a layer of

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photoresist ~~that is used for the creation of device features~~ for
creation of additional functional capabilities of said
semiconductor devices provided on ~~the surface of~~ said substrate.

28. (currently amended) The method of claim 24, wherein said
placing said surface of said patterned ~~and etched~~ layer of
photoresist under an angle with a horizontal direction comprises
~~the steps of:~~

providing a hot plate having a first and a second surface;
mounting said substrate on the second surface of said hot
plate, said second surface facing in an first direction; and
placing said hot plate facing in a second direction.

29. (currently amended) The method of claim 28, said first
direction being ~~substantially about~~ an upward direction.

30. (original) The method of claim 29, said second direction
being any direction not comprising an upward direction.